Trigeneration technology for efficient and clean energy to resort complex in Shanghai

Shanghai International Tourism and Resort Zone CCHP, Pudong District, Shanghai, China

Background

The Shanghai International Tourism and Resort Zone, completed in 2014, is a sprawling, multi-purpose resort that includes two themed hotels, large retail, dining and entertainment venues and a variety of recreation facilities. The world-famous Walt Disneyland park is located in this resort. To meet the complex's energy needs as efficiently and economically as possible, the EPC China Huadian Corporation working with two local partners Shanghai Shendi group and Shanghai Yiliu Group, jointly developed a versatile, comprehensive power plant design that results in substantial cost and emission savings.

That goal was consistent with China Huadian Corporation's own mission, as one of the five state-owned, sole-proprietor power generation corporations created in 2002 by the Chinese government to reform its electricity system.

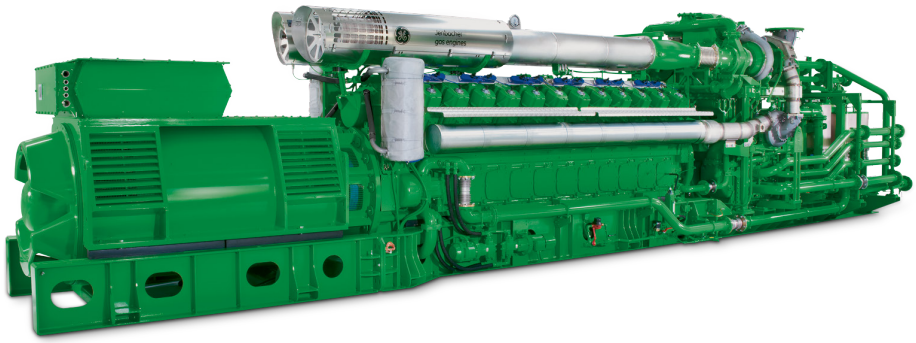
Solution

China Huadian Corporation decided upon an integrated multi generation system, which has established itself as one of the cleanest and most cost-effective ways to generate power, heat and cooling. Toward that end, five of GE's 4.4 MW Jenbacher* J624 natural gas-fired engines have been selected to build the core of the combined cooling, heating and power (CCHP) plant.

The total engine output results in 22 MW electric power capacity and is connected to a 35 kV grid. It co-generates heating and cooling by using the gas engine's cooling and exhaust heat to drive absorption chillers. Additional electric chillers, gas boilers and storage for hot and chilled water as well as a compressed air unit form a highly integrated multipurpose solution.

The J624, a two-staged turbocharged gas engine is designed for achieving high efficiency and low emissions, and is a perfect fit for a highly efficient and integrated cogeneration plant.

GE provided the J624 gas engines for this CCHP power plant through its distributor Yumon-Solomon, which also performs regular maintenance for the gas engines.



Key Technical Data	
Number of units	5 x J624 gas engines
Electrical output	22 MW
Electrical efficiency	45.4 %
Total Efficiency	~ 88 %
Emissions reductions	60,000 tons of CO_2
Annual energy savings	Equivalent to 20,000-ton coal

Result

The installed multipurpose cogeneration plant has tripled the resort's overall efficiency and cut annual CO_2 emissions by about 60,000 tons. With its highly integrated solution, the Shanghai plant owned by Shanghai New Energy is one of the most efficient CCHP plant in China and saves as much annual energy as that produced by 20,000 tons of coal. It's an all-inclusive solution for the Shanghai International Tourism and Resort Zone, as it accounts for the entertainment complex's complete space heating and cooling, hot water and compressed air needs.

"To echo the National Energy Administration's call for distributed power development, we followed the low carbon and energy saving planning concept to build the Shanghai International Tourism and Resorts Zone into a demonstration project of the low carbon park. The gas based CCHP technology is a huge driver to make it happen", said the leader of Shanghai New Energy.

Customer advantages:

- High electrical efficiency of 45.4 %
- High total efficiency of around 88 %
- CCHP plant cuts annual CO_2 emissions by 60,000 tons
- CCHP saves energy equivalent to 20,000 tons of coal per year
- Highly integrated solution to provide economical heating, cooling and power

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GE's Distributed Power business is headquartered in Jenbach, Austria.

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